

# SPECIFICATION

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## **[Insert title of invention] METHOD AND SYSTEM FOR EXTENDING A DISTANCE BETWEEN A PERSONAL COMPUTER AND A KEYBOARD, VIDEO DISPLAY, A MOUSE, AND SERIAL PORT**

### Background of Invention

[0001] In recent years, personal computers have become increasingly prevalent in industries. It is not uncommon today for a company to have scores, if not of PCs in one room with a similar number of stations from which to access these PCs. Often, it is desirable to have the video display, keyboard, and mouse from the location of the PC. Various prior art keyboard, video display, mouse and serial port extenders have been used in the past. One example of a prior art extender system is shown in Figure 1. This system includes a local module which is adjacent to and external to the PC.

[0002] While these extender systems have been used extensively in the past, they do have some drawbacks. First of all, with the local module exterior to the PC, it is necessary to have an additional power supply for the local module. Secondly, there must be a location for this local module; this can be especially troubling when the is an industrial PC disposed in a rack having little additional space for additional modules. Thirdly, the cabling between the local module and the PC often interferes

with other cabling.

- [0003] Consequently, there exists a need for improved methods and systems for extending the separation distance of peripherals and a PC in an efficient manner.

## Summary of Invention

- [0004] It is an object of the present invention to provide a system and method for extending the separation distance of peripherals and a PC in an efficient manner.

- Sub O* [0005] ~~It is a feature of the present invention to utilize a single half-size expansion extender card having both ISA and PCI buss connections thereon to perform as a local module.~~

- [0006] It is another feature of the present invention to include loop wires to connect normal PC video, mouse, keyboard and serial connections to the video, mouse, keyboard and serial connections of the extender card.

- [0007] It is an advantage of the present invention to achieve improved efficiency in installation, manufacture and maintenance of equipment for extending the separation of video, mouse, keyboard and serial port from personal computers.

- [0008] The present invention is an apparatus and method for extending the separation distance of peripherals and personal computers, designed to satisfy the aforementioned needs, provide the previously stated objects, include the above-listed features, and achieve the already articulated advantages. The present invention is carried out in a "wasted installation time-less" manner in a sense that the time consumed with installing an extender system for a PC, especially a PC in a rack of PCs, has been greatly reduced.

- Sub O* [0009] ~~Accordingly, the present invention is a system and method including a single extender card having both ISA and PCI buss connections and loop wires to couple the video, mouse, keyboard and serial signals.~~

## Brief Description of Drawings

- [0010] The invention may be more fully understood by reading the following

of the preferred embodiments of the invention, in conjunction with the appended drawings wherein:

- [0011] Figure 1 is a simplified block diagram view of a system of the prior art.
- [0012] Figure 2 is a simplified block diagram view of a system of the present
- [0013] Figure 3 is a partial cut-away view of a portion of the system of Figure 2.
- [0014] Figure 4 is a schematic representation of a rear portion of a PC of the present invention having a blind-mateable connector thereon.

### Detailed Description

- [0015] Now referring to the drawings wherein like numerals refer to like matter throughout, and more specifically referring to Figure 1, there is shown a system of the prior art, generally designated 100, including a prior art PC 102 which is to a local module 104 via independent cables, such as mouse extension cable 106, keyboard extension cable 108, video extension cable 110 and serial extension 111. Local module 104 is well known in the art and is known to be used to separate keyboard, mouse, video and serial signals onto a single cable, such as cable 112, which is often a category 5 unshielded twisted pair cable having male 45 connectors on either end. Link cable 112 provides the communication path between local module 104 and remote module/ receiver/ transmitter 114. Remote module/ receiver/ transmitter 114 is also well known in the art and is known to separate signals on link cable 112 into distinct cables for communication with remote video display 118, remote keyboard 120, remote mouse 122, and remote serial port or I/O device 121.

- [0016] Now referring to Figure 2, there is shown a system of the present invention, generally designated 200, including a rack 201 including a plurality of industrial 203 and an expansion slot equipped PC 202 having a PCI/ISA keyboard, video, mouse extender expansion card 204 therein. The term "industrial PC" is used to refer to any type of PC which is configured and adapted to be housed in a rack would contain multiple similar PCs. Expansion slot equipped PC 202 can be any

of PC which is capable of receiving therein an expansion card or other device coupled to an internal expansion buss. PCI/ISA keyboard, video, mouse and serial extender expansion card 204 is preferably a single card having both ISA and PCI mating regions thereon. Expansion slot equipped PC 202 is coupled to remote module/ receiver/ transmitter 114 by link cable 112. Remote module/ receiver/ transmitter 114 is coupled to power source 116, remote video display 118, remote keyboard 120, remote serial I/O device 121 and remote mouse 122 in a well-manner.

[0017] A more detailed understanding of the present invention can be achieved by referring to Figure 3, which shows an enlarged cut-away view of expansion slot equipped PC 202 of Figure 2. In a preferred embodiment of the present invention, expansion slot equipped PC 202 is an industrial PC which has sensors therein monitor fan speeds and a temperature of a microprocessor therein and further generates an alert when said fan speeds and said temperature exceed predetermined limits. The sensors are not shown, but are well known in the art. It can be seen that expansion slot equipped PC 202 includes therein a PCI/ISA keyboard, video, mouse and serial extender expansion card 204, of the present invention. PCI/ISA keyboard, video, mouse, and serial extender expansion card 204 is preferably a half-length planar expansion card. PCI/ISA keyboard, video, mouse, and serial extender expansion card 204 communicates with expansion slot PC 202 via cables 312, 314, and 316. Expansion slot equipped PC 202 has thereon PC to keyboard connector 302, which is well known in the art for making such connections. Expansion slot equipped PC 202 further includes PC to mouse connector 304, PC to video connector 306, and PC to serial connector 307, which also well known in the art for making such connections. Cables 312, 314, 316 and 318 are preferably well-known keyboard, mouse, video and serial cables respectively. Cables 312, 314, 316 and 318 are coupled to keyboard PC to expansion card connector 322, mouse PC to expansion card connector 324, video PC to expansion card connector 326, and serial PC to expansion card connector respectively.

[0018] PCI/ISA keyboard, video, mouse and serial extender expansion card 204 also

includes an expansion card to remote module cable link connector 330 which is used to couple to link cable 112.

[0019]

In a preferred embodiment, PCI/ISA keyboard, video, mouse and serial expansion card 204 is powered by connections provided through PCI mating 342, 344, and 346. PCI/ISA keyboard, video, mouse and serial extender expansion card 204 also includes thereon a first ISA mating region 350 and a second ISA mating region 352, which could be used for coupling with an ISA buss connector in expansion slot equipped PC 202 or another PC having an ISA buss. ISA mating regions 350 and 352 can be used to power the preferred embodiment in lieu of PCI regions 342, 344, and 346 when placed in a PC ISA slot. First PCI mating region 342, second PCI mating region 344, and third PCI mating region 346 are shown in PCI expansion slot 340. Typically, PCI expansion slot 340 might be used to any type of PCI expansion card with the main processor of the expansion slot equipped PC 202; however, in this preferred embodiment of the present invention, the connection between PCI expansion slot 340 and first PCI mating region 342, second PCI mating region 344, or third PCI mating region 346 would provide only power to the PCI/ISA keyboard, video, mouse and serial extender expansion card 204. All of the keyboard, mouse, video and serial signals to be communicated between the PCI/ISA keyboard, video, mouse and serial extender expansion card and the main processor of expansion slot equipped PC 202, is done through the cables 312, 314, 316 and 318.

[0020] Also shown is a serial internal ribbon cable 360, which couples to an internal connector 362 and a second serial ribbon cable connector 364, which could be either internal or external.

[0021] In operation, the apparatus and method of the present invention as described Figures 2-3, could function as follows:

[0022] ~~a PC with either a PCI or ISA expansion buss is provided;~~

[0023] a PCI/ISA keyboard, video, mouse and serial extender expansion card 204 is inserted into the expansion buss and receives power therefrom;



- [0024] keyboard, mouse, serial and video signals are communicated between the PC and the PCI/ISA keyboard, video, mouse and serial extender expansion card 204 jumpers or cables 312, 314, 316 and 318 which connect to the standard keyboard, mouse and video connectors found on the back of the PC, and the serial header typically found internal or external to a PC;
- [0025] keyboard, mouse, serial and video signals are combined into a single port;
- [0026] a link cable 112 is coupled to remote module/receiver/transmitter 114;
- [0027] the combined signals are transmitted over Category 5 UTP link cable 112 to remote module/receiver/transmitter 114 where the combined signals are and,
- [0028] the then separated signals are delivered to keyboard, mouse, serial and video devices.
- [0029] Now referring to Figure 4, there is shown a rear portion of a PC 202 of the present invention which includes connector cables 312, 314, 316 and 318 of 3. This Figure 4 includes a blind-mateable male connector, generally designated 400, having a female RJ-45 jack thereon for receiving jumper Category 5 UTP cable 412, which is similar to elongated cable 112, except for length. Connector 400 includes a male blind-mating connector 404. Also shown is an associated blind-mating female connector 406, which is part of the rack 201. The elongated cable 112 is shown coupled to a female RJ-45 connector 408. It should be understood this is merely a preferred embodiment, and variations of the present invention, including, but not limited to, switching male and female connectors, etc., are contemplated and intended to be included herein.
- [0030] Throughout this description, reference is made to an industrial PC because it is believed that the beneficial aspects of the present invention would be most readily apparent when used in connection with industrial PCs; however, it should be understood that the present invention is not intended to be limited to industrial and should be hereby construed to include other non-industrial PCs as well.

[0031] It is thought that the method and apparatus of the present invention will be understood from the foregoing description and that it will be apparent that various changes may be made in the form, construct steps, and arrangement of the parts and steps thereof, without departing from the spirit and scope of the invention or sacrificing all of their material advantages. The form herein described is merely a preferred exemplary embodiment thereof.

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